BEET BREEDING

Root Generation:

A considerable number of inbred lines were advanced to the second to fifth generations and roots saved for continuation of the line and a preliminary test of their probable combining ability. The first hybrid generation of a sugar beet x garden beet cross was grown. The garden beets used in making this cross were selected for relatively high percent sucrose. First hybrid generation roots of 2 crosses of genetic interest were grown. Roots of one of these, involving color factors for root and leaf, were planted in the greenhouse for overwinter seed production. Since practically no leaf spot infection developed in the breeding strain plantings no selections for resistance to this disease could be made at harvest. Many of the inbred lines appear to have reached a considerable degree of homozygosity for characters of foliage and root ype. A few lines show a considerable degree of uniformity in percent sucrose.

Seed Generation:

1939 was a "Poor seed year". Rather more than the usual number of isolations were lost by reason of drouth, hail and insect damage. Cut worms, early in the season, were so numerous at some of the locations that new growth from the mother beet was eaten as fast as it appeared. Blister beetles were numerous at about the time of bloom and seed setting. Several applications of Pyrocide dust were made on the bagging and top cross plots for the control of blister beetles.

In general very poor seed set was obtained from the bagged plants in 1939. This is in striking contrast to the previous year when good sets of bagged seed were numerous. The locations, planting dates for the mother roots and bagging dates were practically identical in the two years. In general there was less precipitation and higher temperatures during the blooming and seed setting period in 1939 than in 1938. Temperatures, however, were not excessive since the bagging plot was located at an elevation of about 7000 feet. Seed secured from isolated and bagged mother beets is summarized in the following table:

ISOLATIONS

No. of Plantings	Seed Produced
143	6 grams or more.
63	1 to 5 grams.
66	few seeds.
84	no seed
1	no record

BAGGING

No. of Beets	Seed Produced
39	1 to 9 grams.
34	30 to 75 seeds.
77	few seeds
18	very few seeds
236	bagged, but no seed.
47	rotted, died, trotzers etc.
7	no record.

* Includes all causes of failure to produce seed; root rotted, plant died, trotzers, accidentally destroyed etc.

In 1937 a certain line produced good sets of bagged seed on two plants. In 1939 four roots from the progeny of these plants produced seed in the bags as follows: 9, 3, 4 and 4 grams respectively. Also 13 roots of related lines produced seed in bags in 1939 as follows: 3 roots rotted and the other 10 had seed yields of 60 seeds, 2 grams, 50 seeds, 4 grams, 50 seeds, few seeds, 2, 2, 2 and 1 gram respectively. These 17 related roots accounted for ten of the highest thirty nine seed yields from over 450 roots planted.

The seed set in bags has been erratic from year to year and more or less unsatisfactory. However the method will be continued for a part of the seed production from breeding strain lines. Since in 1939 most of the bags on any one plant had some seed set in them or all of the bags on a plant had no seed set in any of them it is planned to plant more roots per line and place fewer bags per plant. It is hoped that by this method the chances of securing some seed from a line will be, at least slightly, increased.

The beets planted for bagging at the Dale Creek location, elevation slightly over 7000 feet, come into bloom from about July 1 to 25. The blooming period of beets planted at Fort Collins is usually from about the last days of May to about June 25. This period corresponds to the time of peak demand for labor on the agronomic plots. Beets at Fort Collins tend to produce more single, large seed stalks; while those at the Dale Creek location tend to produce a large number of smaller seed stalks per beet. Bagging is easier with the latter type of growth. The Dale Creek location for bagging will be continued since the advantages of timing and type of growth appear to outweigh the disadvantage of the distance; which is only 35 miles from headquarters.